



FY 2010 Annual Report on Cost Assessment Activities



February 2011

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Director, Cost Assessment and Program Evaluation

February 2011

**Preparation of this report/study cost the Department of Defense
a total of approximately \$129,000 in Fiscal Years 2010-2011.**

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FOREWORD

It is my honor and privilege to serve as the first Director of Cost Assessment and Program Evaluation (CAPE) in the Department of Defense (DoD). A component of the Office of the Secretary of Defense (OSD), CAPE was established by the Weapon Systems Acquisition Reform Act (WSARA) of 2009, Public Law 111-23. Section 101(b) of WSARA requires the CAPE Director to report to Congress annually on the cost estimation and cost analysis activities that the Department conducted during the previous year, along with the progress the Department has made in improving the accuracy of its cost estimates and analyses.

This second annual report describes CAPE's progress in developing and implementing plans responsive to the cost estimation and assessment practices mandated by WSARA. The overall quality of the cost estimates prepared by the military departments continued to improve this year due to increased rigor, better data, and more complete documentation and accountability. Much remains to be done to realize the performance goals established by the President and the Congress. The Department is continuing on a journey that will require additional manpower, training, and investments in analytic methods and data. Our effort is focused on accuracy and best value to the taxpayer. Progress towards achieving these goals will be measured incrementally over time.

The organization's ultimate intent is to provide sound and unbiased cost and schedule assessments that are essential for effective acquisition decision-making and oversight. I look forward to describing CAPE's continuing efforts to achieve this goal and the progress we make in future editions of this report.



Christine H. Fox
Director
Cost Assessment and Program Evaluation

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CHAPTER I – INTRODUCTION

The office of CAPE provides independent analysis and advice to the Secretary of Defense and other senior officials on a wide range of issues concerning (1) cost estimation and cost analysis for major DoD acquisition programs; (2) the DoD Planning, Programming, Budgeting, and Execution (PPBE) system; (3) resource discussions relating to military requirements; (4) analysis of alternatives to ensure that DoD considers the full range of program and non-materiel solutions; (5) evaluations of alternative military force structure, plans, and systems; and (6) the development of improved analytical skills and competencies within the cost assessment and program evaluation workforce of the Department. This report is concerned with the first topic—cost estimation and cost analysis.

Section 101(b) of WSARA¹ requires that the CAPE submit an annual report to the Congress on an assessment of:

(A) the extent to which each of the military departments and Defense Agencies have complied with policies, procedures, and guidance issued by the Director with regard to the preparation of cost estimates for major defense acquisition programs and major automated information systems;

(B) the overall quality of cost estimates prepared by each of the military departments and Defense Agencies for major defense acquisition programs and major automated information system programs; and

(C) any consistent differences in methodology or approach among the cost estimates prepared by the military departments, the Defense Agencies, and the Director.

Since WSARA was enacted on May 22, 2009, the CAPE office has worked toward fulfilling these requirements.

One of the main goals of WSARA is to avoid substantial growth in the costs of major DoD acquisition programs. Toward that end, CAPE is responsible for ensuring that the cost estimation and cost analysis processes of the Department provide accurate information and realistic estimates of cost for the major DoD acquisition programs. The principal tools CAPE has to meet this responsibility are preparation of independent cost estimates for many major defense acquisition programs (MDAPs) and automated information systems and, for other specified major system acquisitions, reviews of cost estimates prepared by the military departments and Defense Agencies.

The organization of this report is as follows:

- Chapter II provides an overview of cost analysis in the Department. It describes the range of cost analysis organizations throughout the Department and explains the process for preparing cost estimates that support the defense acquisition process. Also, it identifies the main DoD cost data

¹ The annual report requirement of WSARA section 101(b) is codified in section 2334(f) of title 10, *United States Code*.

collection systems. CAPE is working to evaluate all of DoD's organizations and processes, keeping, or in some cases strengthening, what works, and discarding or repairing what does not.

- Chapter III describes the status of the certifications (required by sections 2366a and 2366b² of title 10, *United States Code*) that MDAPs must obtain. For new programs, the certification requirements are intended to help establish realistic program definitions and cost and schedule targets. For programs already underway, the certification requirements are intended to put the applicable programs on a more stable footing and help preclude substantial additional cost growth. CAPE is committed to providing realistic and independent cost estimates to support decision-making and an informed certification process. This chapter also provides information about the degree of DoD compliance in meeting its own established requirements for cost data reporting for the MDAPs.
- Chapter IV reviews the Department's FY 2010 cost estimation and cost analysis activities associated with major DoD acquisition programs. These cost activities include independent cost estimates, augmented by assessments of military department and Defense Agency cost estimates, which inform the DoD decision authorities at milestone reviews and at other important events. This chapter also summarizes the degree to which DoD cost estimation and assessment activities in FY 2010 complied with the established procedures, and discusses overall quality and any consistent differences in methodology among the cost estimates.
- Chapter V describes the status of several key ongoing initiatives that will ensure that the cost assessment and cost estimating functions for the Department will change as required to meet the expanded roles and responsibilities established by WSARA and meet the needs of the Department. These initiatives address a wide range of issues and concerns, including organizations and human resources, cost estimating policy or procedure changes, cost data systems, improved tools and methods, and education and training opportunities for the DoD cost community.

The CAPE long-term goal is to ensure that the DoD cost estimating community has sufficient resources and is provided the necessary guidance and authorities to ensure that program cost and schedule estimates are properly prepared and considered in the Department's deliberations on all major DoD acquisition programs. The progress in reaching this goal will continue to be described in future editions of this report.

² Sections 2366a/b "Major defense acquisition programs: certification required before Milestone A/B or Key Decision Point A/B approval."

CHAPTER II – OVERVIEW OF COST ANALYSIS IN DOD

This chapter identifies the organizations, policies, procedures, and supporting data systems for cost estimation in place throughout DoD. Chapter V of this report provides a description of efforts to continue to strengthen these institutions to meet the requirements of WSARA.

This report assumes a modest familiarity with the defense acquisition process on the part of the reader. Readers in need of an introduction to the defense acquisition process are encouraged to refer to the *Defense Acquisition Guidebook* (see <https://dag.dau.mil>).

Overview of Cost Analysis Organizations in DoD

There are cost organizations throughout DoD—in OSD, at the headquarters of the DoD Components (military departments and Defense Agencies), and in Components' field organizations. DoD has a wide range of cost organizations with each group having a unique but complementary role in support of the defense acquisition process and the broader operations of the Department.

At the OSD level, the CAPE Director is responsible for providing independent cost estimates, for both MDAPs and major automated information system (MAIS) programs, when the Milestone Decision Authority for a program is the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)). Also, the CAPE Director establishes policies for preparation and review of DoD Component cost estimates for other MDAPs and MAIS programs.

Each military department headquarters has its own Service Cost Agency. These cost estimating agencies provide independent cost estimates when acquisition oversight is delegated to the Component and the Milestone Decision Authority is the Component Head or Component Acquisition Executive. Also, the Agencies support other important cost analyses and provide policy guidance unique to each of the military departments. The Service Cost Agencies reside in the financial management organizations of their military departments, and are outside their military department's acquisition chain of command.

There are also many field-level cost organizations. These organizations provide resources to support higher headquarters cost estimates and analyses, and they also provide assistance to support day-to-day operations of program offices and similar entities. Examples of such activities include evaluation of contractor proposals and should-cost analyses; support to competitive source selections; cost estimates in support of the programming and budgeting processes; and cost estimates used in specific analytic studies, such as systems engineering design trades or analyses of alternatives. Field-level elements of the cost community workforce typically possess important specialized cost and technical experience unique to specific system types or commodity groups (such as satellites, submarines, or tactical missiles).

In collaboration with the Service Cost Agencies, CAPE initiated a survey of the size, shape and organization of the DoD cost community. This has given a better understanding of the levels of the community to inform the leadership of the Department in support of efforts to improve training and standardization and to increase the efficiency of the Department.

At the direction of the Secretary, the Director, CAPE formed a Cost Working Group in 2010 to guide the development of simple, intranet-based, cost analysis tools for use by all of the employees of the

Department of Defense. This group directly supports the Secretary's initiative to instill a 'Culture of Savings' throughout the entire Department, a culture in which costs are explicitly considered as a part of every decision made in the DoD. The Cost Working Group began work on three specific simple cost models with the goal of fielding these models during FY 2011: a model to estimate the costs of reports and studies prepared in the Department, a model to estimate the costs of hosting or attending a conference, and a model to estimate the costs of hosting a ceremony or an event.

As reported in our 2009 Annual Report, CAPE was to sponsor a DoD-wide cost research workshop to gain uniform insight into cost research plans. Because of the activities of the Cost Working Group, DoD did not host this event in FY 2010. CAPE intends to revisit the benefit of conducting this workshop in the future, and will orient the topics for future workshops to make them as productive as possible for DoD.

Appendix A provides a brief description of each Service Cost Agency and field-level cost organization.

Procedures for Cost Assessments at Milestone Reviews and Other Events

This section provides a description of DoD cost assessment procedures for MDAPs and MAIS programs, many of which have been updated or added after enactment of WSARA.

Cost Assessment Procedures for Major Defense Acquisition Programs

Public law (section 2334 of title 10, *United States Code*) requires that an independent estimate of the life-cycle cost for an MDAP be prepared and presented to the Milestone Decision Authority before the approval to proceed with Milestone A or B, or any decision to enter low-rate initial production or full-rate production. At these key milestone reviews, when the Milestone Decision Authority is the USD(AT&L), the independent cost estimate is prepared by the Director, CAPE. When the Milestone Decision Authority is delegated to the DoD Component, the independent cost estimate supporting a milestone decision is provided by the applicable Service Cost Agency or the Defense Agency equivalent, and subsequently reviewed by CAPE. DoD policy and procedures for such independent cost estimates are prescribed in DoD Instruction 5000.02, *Operation of the Defense Acquisition System*. After the enactment of WSARA, DoD updated these procedures in Directive-Type Memorandum (DTM) 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act of 2009*.

One important element of current DoD policy for MDAPs requires the Component to establish a formal position on the estimated cost of the program and, furthermore, the Component must commit to fully fund the program consistent with the Component cost position. In practice, the Component typically establishes its cost position by performing a Component-wide corporate review, led by the Service Cost Agency or the Defense Agency equivalent, after consideration of a program office cost estimate and preparation of a Component independent cost estimate or assessment.

WSARA also revised the procedures for the certification for a MDAP that experienced sufficient cost growth to trigger a critical unit cost (Nunn-McCurdy) breach (as defined in section 2433 of title 10, *United States Code*). Upon such a breach, the USD(AT&L) can certify that the program meets certain criteria (set forth in section 2433a of title 10, *United States Code*), in which case the program can continue, or it may be terminated. One element of the required certification is the reasonableness of the new estimates of program unit costs. The determination that new program unit costs are reasonable is made by the Director, CAPE, and certified by the USD(AT&L). As part of a standard business practice,

CAPE prepares its own independent cost estimate that is used as a benchmark to support the assessment of reasonableness of the new unit cost estimates. Also, the CAPE independent cost estimate includes a quantitative assessment of the factors, both internal and external to the program, that led to the unit cost growth relative to the original baseline estimate. This assessment is provided to the Director of Performance Assessments and Root Cause Analyses (PARCA) to assist in the assessment of root causes of cost growth (e.g., failures in processes or decision-making). A review of the FY 2010 critical unit cost breaches and certifications, and supporting cost assessment activities, is provided in Chapter IV. Appendix B provides a description of the procedures for unit cost reporting, and the criteria for a Nunn-McCurdy unit cost breach.

Cost Assessment Procedures for Major Automated Information Systems

WSARA specifies that CAPE is responsible for preparing independent cost estimates for any MAIS program that has experienced a Critical Change (as defined in Appendix C) if the Milestone Decision Authority is the USD(AT&L). CAPE may also prepare an independent cost estimate for a MAIS program at any other time considered appropriate by the CAPE Director, or upon the request of the USD(AT&L). In addition, for the MAIS programs for which acquisition oversight has been delegated to the Component, CAPE is responsible for establishing policies for preparation and review of Component cost estimates at milestone reviews, and for revised program cost estimates in support of certification of a MAIS program that has experienced a Critical Change.

The acquisition oversight of MAIS programs has also been changed by additional legislation. Until recently, a program that met the criteria for both a MDAP and a MAIS program had to meet the statutory and regulatory requirements for both types of programs. This was changed by section 817 of the *National Defense Authorization Act for Fiscal Year 2010, Public Law 111-84*. Today, a program that meets both criteria will be treated as either a MDAP or a MAIS program, but not both. As a general rule, a program that meets both criteria will be regarded as a MDAP if it requires the development of customized hardware, and it will be regarded as a MAIS program if it does not require the development of customized hardware.

Multi-Year Procurement

Public law (section 2306b of title 10, *United States Code*) establishes several criteria that must be satisfied and certified by the Secretary of Defense prior to the contract award for a multi-year procurement for a defense acquisition program. Some of these criteria (concerning substantial savings, realistic cost estimates, and availability of funding) must be supported by a CAPE cost analysis of the proposed multi-year procurement strategy. This analysis includes a comparison of the estimated costs of multi-year and annual contract awards. The analysis is based on actual cost data and experience to date, as well as an evaluation of cost realism in the contractor's proposals.

Confidence Levels in Cost Estimates

WSARA, as originally enacted, required (1) a statement concerning the confidence level used in establishing a cost estimate of a MDAP or a MAIS program, (2) the rationale for selecting the specific confidence level used in the estimate, and (3) the justification for selecting the lower confidence level if it is less than 80 percent. During the FY 2010 cost assessment activities described in Chapter IV, the approach taken by CAPE and the Service Cost Agencies was not consistent with an 80 percent confidence

level. In general, the cost estimates made by CAPE have been built on a product-oriented work breakdown structure, based on conservative assumptions that are consistent with actual demonstrated contractor and government performance for a series of acquisition programs in which the Department has been successful.

The WSARA requirement for confidence levels in cost estimates was modified by section 811 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*. With this modification, there will no longer be a requirement to justify the choice of a confidence level that is lower than 80 percent. In the future, the requirement will be to select a confidence level such that it provides a high degree of confidence that the program can be completed without the need for significant adjustment to program budgets.

Cost Analysis Requirements Description

CAPE requires and provides guidance on the technical content and use of a document known as the Cost Analysis Requirements Description (CARD). The CARD provides information on the acquisition program that is used in preparation of both the Component cost positions and the CAPE independent cost estimates. The CARD describes the key technical, programmatic, and operational characteristics of an acquisition program. The foundation of a sound and credible cost estimate is a well-defined program, and the CARD is used to provide that foundation. Current efforts to streamline and strengthen the CARD process are described in Chapter V.

DoD Cost Data Collection Systems

Systematic and institutionalized cost data collection and validation is critical to the preparation and support of credible cost estimates. DoD has three primary collection systems for cost data for MDAPs. The Cost and Software Data Reporting (CSDR) system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with MDAPs. The Earned Value Management (EVM) Central Repository is used to collect and archive EVM reporting documents (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports). The Visibility and Management of Operating and Support Costs (VAMOSOC) systems collect historical operating and support (O&S) costs for fielded major weapon systems. Appendix D provides additional details concerning all of these data collection systems, and Chapter V discusses current CAPE efforts to improve them.

Summary

This chapter sketched the cost assessment organizations, policies and procedures, and data collection systems in DoD. These provide the foundation on which the Department is building as it continues to implement WSARA. The initiatives that comprise this implementation and the vision of the changes that are being made are described in Chapter V of this report.

CHAPTER III – COMPLIANCE FOR CERTIFICATIONS AND REPORTING

MDAPs are required by statute to obtain certain certifications. Some of these certifications must be supported by the appropriate independent cost estimate or assessment. This chapter describes the status of the Department's activities to complete the certifications requiring independent cost estimates or assessments as of the end of FY 2010. In addition, it identifies the extent to which DoD is meeting its own regulatory cost and software data reporting requirements.

Sections 2366a & 2366b-Certification Requirements for Major Defense Acquisition Programs

The *National Defense Authorization Act for Fiscal Year 2006, Public Law 109-163* established a requirement that the Milestone Decision Authority certify that several criteria are met by any MDAP approaching Milestone B (permission to enter Engineering and Manufacturing Development). To meet this requirement, the Milestone Decision Authority must sign a certification memorandum for the record that affirms that the program meets the specified criteria (concerning program affordability, technological maturity, and other considerations). This memorandum is then submitted to the congressional defense committees with the program's next Selected Acquisition Report (SAR). The specific certification criteria were strengthened and expanded in subsequent legislation, with additional criteria concerning reasonable cost and schedule estimates and full funding. Moreover, the *National Defense Authorization Act for Fiscal Year 2008, Public Law 110-181*, established additional certification criteria for MDAPs approaching Milestone A³. The current milestone certification criteria are codified in sections 2366a and 2366b of title 10, *United States Code*.

Some elements of the certification criteria for both Milestone A and Milestone B approval address the adequacy of program cost estimates. The current certification criteria concerning cost estimates for programs approaching Milestone A are provided in Figure 1.

³ The Milestone A decision is approval for a program to enter the Technology Development phase.

Figure 1:
Major Defense Acquisition Program Milestone A
Certification Requirements Concerning Cost Estimates

Implementation of Section 2366a of Title 10, United States Code, **as amended by the Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23)**

(a)(5) that a cost estimate for the program has been submitted, **with the concurrence of the Director of Cost Assessment and Program Evaluation**, and that the level of resources required to develop and procure the program is consistent with the priority level assigned by the Joint Requirements Oversight Council

The criteria concerning cost estimates and funding for programs approaching Milestone B are provided in Figure 2 below.

Figure 2:
Major Defense Acquisition Program Milestone B
Certification Requirements Concerning Cost Estimates

Implementation of Section 2366b of Title 10, United States Code, **as amended by the Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23)**

(a)(1)(C) reasonable cost and schedule estimates have been developed to execute, **with the concurrence of the Director of Cost Assessment and Program Evaluation**, the product development and production plan under the program; and

(D) funding is available to execute the product development and production plan under the program, through the period covered by the future-years defense program submitted during the fiscal year in which the certification is made, consistent with the estimates described in paragraph (C) for the program

The most recent changes included as part of WSARA are highlighted in bold text. Since enactment of WSARA, the determination of the adequacy of program cost estimates is made by the Milestone Decision Authority—with the concurrence of the CAPE Director—after consideration of the appropriate independent cost estimate.

Further discussion of the most recent DoD policies and procedures associated with MDAP milestone certifications is provided in Directive-Type Memorandum (DTM) 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act Of 2009* (see <https://acc.dau.mil/wsara>). A complete listing of the Milestone A certification requirements is provided in attachment 2 of DTM 09-027 (see

https://acc.dau.mil/dag_dtm09-027p3), and a listing of the Milestone B certification requirements is provided in attachment 3 (see https://acc.dau.mil/dag_dtm09-027p4).

Before enactment of WSARA, the Department was up to date in meeting the section 2366a and 2366b certification requirements. The certification process before WSARA applied to MDAPs as they proceeded through Milestone A or Milestone B; it did not apply retroactively to MDAPs that had passed either milestone before the sections 2366a/b certification requirement were established. WSARA, however, not only expanded the sections 2366a/b certification criteria, but also retroactively applied them to MDAPs that had yet to reach Milestone C, had passed their Milestone A or Milestone B prior to the enactment of the certification requirements, and were not certified in accordance with the appropriate Milestone A or Milestone B criteria. This change created a significant backlog of MDAPs that need to obtain the certifications required by sections 2366a/b. These retroactive certifications are referred to as “catch-up” certifications.

For the MDAPs that were already past Milestone C at the time of WSARA enactment, there was some degree of ambiguity about the requirements for retroactive certifications. Based on a request by DoD, the Congress included a clarification that 2366a/b certifications were not required for MDAPs already past Milestone C approval in section 813 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*. This clarification removed any requirement for unnecessary certifications for 57 mature programs.

Sections 2366a/b-Certification Status for Major Defense Acquisition Programs

By the end of FY 2010, the office of USD(AT&L) had determined that there were a total of 60 MDAPs and pre-MDAPs that were required at some point to obtain the certification required by sections 2366a/b. These 60 programs fall into five groups:

1. Thirteen of these programs had been certified by the end of FY 2009. The cost assessment activities that supported these certifications were discussed in last year’s Annual Report on Cost Assessment Activities.
2. Another ten programs were certified during FY 2010. One of these programs was supported by cost assessment activities in the prior year (FY 2009). The other nine programs were supported by cost assessment activities in the same fiscal year (FY 2010). The cost assessment activities for these nine programs are identified in Chapter IV.
3. There was one program that had been certified, but the milestone decision was rescinded, and this program will need to be certified again⁴.
4. There are 26 programs that will need to be 2366b certified. Of these, six programs will require a 2366b certification that coincides with a Milestone B review, and 20 programs will require a “catch-up” certification.
5. There are ten programs that will need to be 2366a certified. All of these certifications will take place at a Milestone A review, and will not be considered as “catch-up” certifications.

CAPE will continue to work with the USD(AT&L) staff to project the 2366a/b certification activities for MDAPs and help guide the cost assessment community’s resources to the priority programs. Information

⁴ This program is the KC-X Aerial Refueling Aircraft.

about future certifications, and associated cost estimates and analyses, will be included in subsequent editions of this report.

Cost and Software Data Reporting Compliance

As described in Chapter II and Appendix D, the CSDR system serves as the primary source of acquisition cost data for major contracts and subcontracts for the MDAPs. The Defense Cost and Resource Center (DCARC) within CAPE is the primary organization responsible for managing the CSDR system. The DCARC continually monitors each MDAP for compliance with cost and software data reporting requirements where applicable.

CSDR reporting is not required when (1) the program is pre-Milestone A, with no prototypes, or (2) the CSDR requirements have been waived by CAPE. Waivers for CSDR requirements may be granted when (1) the program is a procurement of a commercial system, or (2) the program is purchased under competitively awarded, firm fixed-price contracts, as long as competitive conditions continue to exist.

For the programs for which CSDR reporting is required and that are monitored for compliance, the compliance ratings established by the DCARC are based on the following five criteria:

- CSDR reporting plans have been submitted and approved.
- Approved reporting plans have been included in the appropriate request for proposal.
- Supporting contract data requirements (i.e., Contract Data Requirements Lists) for the various CSDR reports have been submitted.
- CSDR reports have been submitted on time consistently.
- CSDR reports have passed DCARC validation procedures consistently.

A program is rated fully compliant when all five criteria are met with no missing or incomplete items. A program is rated mostly compliant when all CSDR reporting requirements are placed on contract, but one or more criteria are not completely met. A program is rated not compliant when either (1) contracts were awarded that did not meet CSDR reporting requirements, or (2) any deficiency in meeting any of the five criteria has been open and unresolved for more than 3 months past the required due date.

For FY 2010, approximately 93 percent of the programs that have CSDR reporting were fully or mostly compliant based on the criteria above; the remaining 7 percent (8 programs) are classified as not compliant. This is a welcome improvement over FY 2009, where only 85 percent of the programs were considered fully compliant or mostly compliant. CAPE and DCARC are continuing to emphasize the importance of CSDR reporting compliance for achieving more accurate program life-cycle cost estimates in the future.

The DCARC aggressively works with all the reporting programs to improve compliance with reporting requirements and data quality. The DCARC Web site (<http://dcarc.pae.osd.mil>) provides downloadable report formats and definitions, report examples, and sample language for inclusion in Request for Proposals (RFPs). The Web site also offers on-line CSDR process tutorials. Also, the DCARC provides on-site training sessions for Government and industry organizations several times per year, at sites throughout the nation. Other efforts to improve DoD cost data collection are described in Chapter V.

CHAPTER IV – DOD COST ASSESSMENT ACTIVITIES IN FY 2010

This chapter provides a summary of the DoD cost estimates and cost analyses that were made in FY 2010 in support of milestone reviews and similar events, as well as unit cost (“Nunn-McCurdy”) breaches, for major DoD acquisition programs.

DoD Milestone Review Cost Assessment Activities in FY 2010

Table 1 provides a summary of the milestone or other review cost assessment activities in FY 2010. For each major acquisition program with a milestone review or other event, Table 1 identifies the program name and acronym, the responsible Component, the supporting cost estimate(s) or analyses presented to the Milestone Decision Authority, and the review event being supported.

There were 20 milestone review or other events supported by cost assessment activities in FY 2010. All of them were supported by the appropriate cost estimates or analyses that complied with the requirements of WSARA and the established cost assessment procedures described in Chapter II. In particular, each of the milestone reviews was supported by (1) a Component cost position, and (2) the appropriate CAPE or Service Cost Agency independent cost estimate. As noted in Chapter III, nine of these milestone reviews were also used to support a concurrent 2366a or 2366b certification.

The overall quality of the cost estimates prepared by each of the military departments continued to improve this year due to increased rigor. As noted in Chapter II, CAPE has instituted a policy—currently in place for all MDAPS—requiring that a signed, dated service cost estimate and position must be delivered to CAPE prior to preparation of an independent cost estimate to support each major milestone review of the Defense Acquisition Board (DAB). Also, the military department’s financial and acquisition communities must provide a statement affirming their commitment to fully fund the program to the Service Cost Position during the preparation of the next Program Objective Memorandum (POM) and Future Years Defense Program (FYDP).

The quality of the cost estimates provided by the military departments also continued to improve this year due to better data. This is largely attributable to improved availability of actual cost information for DoD programs as a result of the long-term initiative to collect contractor cost and software data reports at the DCARC, and the long-term efforts of each of the military departments to improve the collection of actual operating and support cost information through the VAMOS systems.

For MAIS programs, OSD CAPE involvement in cost estimates is currently limited to those programs that experience a ‘critical change,’ as defined in statute (described in Appendix C), and those programs for which the USD(AT&L) remains the milestone decision authority. There remains much work to be done to improve the management and preparation of cost estimates for the approximately 44 MAIS programs now in the DoD portfolio.

Similarly, OSD CAPE had only limited involvement in cost estimates prepared for major defense agency acquisition programs this year. For example, the Missile Defense Agency (MDA) remains exempt from DoD acquisition regulations. Therefore, CAPE does not routinely prepare independent cost estimates for MDA’s major acquisition programs.

Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2010

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
EA-18G Growler	EA-18G	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	27-Oct-09	Full-Rate Production Decision	23-Nov-09
Army Integrated Air & Missile Defense	IAMD	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	14-Dec-09	Milestone B (2366b certification)	23-Dec-09
Multifunctional Information Distribution System Joint Tactical Radio System	MIDS JTRS	Joint	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position Air Force Service Cost Position	17-Dec-09	Limited Production and Fielding Decision	23-Dec-09
Early-Infantry Brigade Combat Team Modernization Increment 1	E-IBCT	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	21-Dec-09	Milestone C	24-Dec-09
MQ-1C Unmanned Aircraft System (Gray Eagle)(formerly Extended Range/Multi-Purpose Unmanned Aircraft System (ER/MP UAS)) ¹	MQ-1C UAS	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	2-Feb-10	Milestone C	29-Mar-10
Warfighter Information Network -- Tactical Increment 2	WIN-T Inc 2	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	2-Feb-10	Milestone C	9-Mar-10

¹ The Gray Eagle UAS Milestone C approval was subsequently rescinded, and later restored on 25 March 2011.

**Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2010
(cont.)**

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
HC/MC-130 Recapitalization Program	HC/MC-130J	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	4-Mar-10	Milestone C (2366b certification)	12-Apr-10
C-130 Avionics Modernization Program	C-130 AMP	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	23-Mar-10	Milestone C (2366b certification)	19-Jun-10
F/A-18 E/F Super Hornet	F/A-18 E/F	Navy	ACAT IC	CAPE Analysis of Savings for Multi-Year Procurement Contract	29-Apr-10	Award of Multi-Year Procurement Contract for FY 2010-13	28-Sep-10
Navy Multiband Terminal	NMT	Navy	ACAT IC	NCCA Independent Cost Estimate Navy Service Cost Position	28-Jul-10	Milestone C	25-Aug-10
Common Missile Warning System Subprogram	CMWS	Army	ACAT IC	CAPE Independent Cost Estimate Army Service Cost Position	30-Jul-10	Milestone C (2366b certification)	3-Sep-10
Wideband Global SATCOM	WGS	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	3-Aug-10	Milestone C (2366b certification)	11-Aug-10
Virginia Class Submarine	SSN 774	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	4-Aug-10	Milestone III/Full-Rate Production Decision (2366b certification)	3-Sep-10

**Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2010
(cont.)**

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
Small Diameter Bomb Increment II	SDB II	Joint	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position Navy Service Cost Position	9-Aug-10	Milestone B (2366b certification)	6-Aug-10
P-8A Poseidon	P-8A	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	11-Aug-10	Milestone C (2366b certification)	27-Aug-10
Air and Missile Defense Radar	AMDR	Navy	Pre-MDAP	CAPE Independent Cost Estimate Navy Service Cost Position	26-Aug-10	Milestone A (2366a certification)	30-Sep-10
Warfighter Information Network -- Tactical Increment 3	WIN-T Inc 3	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	27-Aug-10	Acquisition Program Baseline Approval	22-Oct-10
Defense Enterprise Accounting and Management System Increment 1	DEAMS Inc 1	Air Force	Pre-MAIS	CAPE Independent Cost Estimate Air Force Service Cost Position	9-Sep-10	Critical Change Certification	30-Sep-10
Apache Block III	AB3	Army	ACAT ID	CAPE Independent Cost Estimate Army Service Cost Position	24-Sep-10	Milestone C	7-Oct-10
C-5 Reliability Enhancement and Reengineering Program	C-5 RERP	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	30-Sep-10	Full-Rate Production Decision	19-Oct-10

The term "ACAT ID" refers to a MDAP where the Milestone Decision Authority is the USD(AT&L).

The term "ACAT IC" refers to a MDAP where acquisition oversight has been delegated to the Component.

The term "pre-MDAP" refers to a program activity that is anticipated to result in a MDAP upon formal program initiation into the defense acquisition management process (which usually occurs at Milestone B).

The term "pre-MAIS" refers to a program activity that is anticipated to result in a MAIS program upon formal program initiation.

Finally, we observe no consistent differences in methodology or approach between the cost estimates prepared by the military departments and CAPE. Generally the approach employed by the military departments is evolving to become more similar to that employed in CAPE: collect actual cost information from ongoing and historical programs; use that information to prepare cost and schedule forecasts for new programs, or programs proceeding to the next milestone in the acquisition process; and review the actual cost information collected, as each individual program proceeds, to update and adjust the cost and schedule forecasts for the program to reflect actual experience. As the Department improves the systematic collection of actual cost information over time, we fully expect smaller differences between the cost and schedule forecasts of the military departments and CAPE in the future.

Remarks about Specific Programs

- The Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) program was subject to a streamlined Limited Production and Fielding review, in lieu of a Milestone C review. The USD(AT&L) determined that a Milestone C decision was not required for MIDS JTRS, since the overarching MIDS program had a successful Milestone III decision in September 2003.
- CAPE prepared an independent analysis in support of the Multi-Year Procurement (MYP) contract award for the F/A-18E/F. This analysis is required by law (section 2306b of title 10, *United States Code*), and addressed whether the contract provides substantial savings, is based on realistic cost estimates, and is properly funded. As a direct result of this analysis, the Department of the Navy was able to reduce the negotiated cost of the multi-year contract by approximately \$90 million to achieve a 10 percent projected savings relative to the cost of annual procurement contracts—a figure mandated by the DoD leadership for this specific multi-year contract.
- The Common Missile Warning System (CMWS) is a subprogram of the Advanced Threat Infrared Countermeasure/Common Missile Warning System (ATIRCM/CMWS) program.
- In May 2009, the USD(AT&L) directed updates to the Army Service Cost Position and the CAPE Independent Cost Estimate for Warfighter Information Network - Tactical (WIN-T) Increment 3 (Inc 3) prior to the approval of a revised Acquisition Program Baseline (APB). The APB was revised to reflect a significant restructure of the Army's Future Combat System, which affected requirements for WIN-T Inc 3.
- Following a Nunn-McCurdy review and certification in June 2010, the USD(AT&L) directed that the Apache Block III (AB3) upgrade be partitioned into two distinct programs. The AB3A refers to remanufactured legacy aircraft, and the AB3B refers to the procurement of new aircraft.

DoD Critical Unit Cost (Nunn-McCurdy) Breaches in FY 2010

Table 2 provides a summary of the cost assessment activities supporting certification decisions associated with critical unit cost (Nunn-McCurdy) breaches in FY 2010. For each major acquisition program with a critical breach, Table 2 identifies the program name and acronym, the responsible Component, the supporting cost estimate(s) or analyses presented to the USD(AT&L), and the date of the critical breach certification.

There were six critical breach certifications in FY 2010. All of them were supported by the appropriate cost estimates and analyses that complied with the requirements of WSARA and the established cost assessment procedures described in Chapter II. For the critical breach certifications, the event was supported by (1) new estimates of program unit cost, as reflected in the December 2009 SAR⁵, and (2) the corresponding CAPE independent cost estimates for program unit cost. In all cases, the Department modified the program definition—including technical content, costs, and planned schedules—prior to the USD(AT&L) certification of the program to the Congress.

In addition to these six programs, one program was declared to be in a critical breach near the end of FY 2010. The Excalibur program submitted an exception SAR that was effective September 30, 2010. The resulting certification review, and supporting CAPE independent cost estimate, will take place in FY 2011, and the results of this review will be discussed in next year's annual report.

A description of unit cost (Nunn-McCurdy) reporting, and the certification process associated with unit cost breaches, is provided in Appendix B.

⁵ Each SAR was dated as of December 31, 2009; was submitted in February 2010; and supported the FY 2011 President's Budget.

Table 2. Nunn-McCurdy Critical Unit Cost Breaches in FY 2010

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
Advanced Threat Infrared Countermeasures/ Common Missile Warning System	ATIRCM/CMWS	Army	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	17-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10
Remote Minehunting System	RMS	Navy	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	19-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10
Wideband Global SATCOM	WGS	Air Force	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	24-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10
Apache Block III	AB3	Army	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	25-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10
DDG 1000 Destroyer	DDG 1000	Navy	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	27-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10
F-35 Lightning II (previously Joint Strike Fighter)	F-35	Joint	ACAT ID	CAPE Independent Cost Estimate December 2009 SAR	28-May-10	Nunn-McCurdy Critical Breach Certification	1-Jun-10

Other Cost Assessment Activities in FY 2010

Additional Milestone A Review Activities

Due to recent changes in statute and regulation, there is increasing importance attached to the Materiel Solution Analysis phase leading to the Milestone A review. The Materiel Solution Analysis phase presents the first substantial opportunity to influence design—through trade-off studies and Analysis of Alternatives (AoA)—by balancing requirements, performance, technology choices, schedule, and cost considerations. In FY 2010, CAPE initiated two important cost assessments that supported Milestone A reviews:

- *Ohio-Class Submarine Replacement Program and Cost-Design Trades.* The recent review of the Ohio-Class replacement (also known as SSBN(X)) provides an important and pioneering example where the cost assessment activities supported a rigorous analysis and discussion of cost-design trades. Informed by the alternatives identified in the AoA, supported by cost models based on prior program and ship-yard cost experience, the DAB review considered the size of the Ohio-Class replacement, the number of missile tubes required, and the establishment of unit cost targets for the program.
- *Ground Combat Vehicle (GCV) and Requirements Trades.* Recent analyses leading up to the planned GCV Milestone A review have demonstrated the importance of achieving correct definition of requirements prior to program initiation. As a result of Army analysis supporting the AoA, and additional cost and schedule analyses developed for the Milestone A review, the Army rescinded the original RFP issued in FY 2010 and made modifications to the RFP to attempt to make the program cost, schedule, and requirements more realistic and affordable.

The two cases discussed above are not shown in Table 1, as the cost assessments noted in Table 1 are limited to those with a review event that concluded in FY 2010. For these two cases, the Milestone A review will carry over to the following fiscal year. Additional information about these programs will be provided in next year's annual report.

Report to Congress on O&S Costs of Major Defense Acquisition Programs

WSARA required CAPE to review existing systems and methods of the DoD for tracking and assessing O&S costs of MDAPs, and to make appropriate findings and recommendations. The results of this review were provided as a one-time report to the Congress in May 2010. The motivation for this review was the fact that the focus of DoD management is typically on near-term program affordability and funding, even though O&S costs for major weapon systems can often be the largest component of overall system life-cycle cost—often as much as 70 percent.

The report provides a comprehensive assessment of the current systems and methods to track and assess O&S costs, and makes several recommendations regarding management oversight, data collection and analysis, and staffing. The specific recommendations in the report, along with a discussion on the current status of implementation, are as follows:

- *Expand the assessment of O&S costs at key management decision points (such as DAB milestone reviews) throughout the system life cycle.* Working with the Under Secretary of Defense for

Acquisition, Technology and Logistics and the Assistant Secretary for Logistics and Materiel Readiness, CAPE has developed a standard template for the presentation of O&S costs to inform DAB deliberations. This template is now in use and will be refined based on DAB experience. CAPE also has initiated more rigorous and detailed analyses of O&S costs for the highest priority programs, such as the F-35. These analyses are being provided to inform DAB deliberations and support the tracking and assessment of O&S cost estimates relative to program O&S affordability targets.

- *Continue to establish contractor cost reporting requirements for high-dollar value contractor logistics support (CLS) and similar sustainment contracts.* This year, the DCARC in CAPE put in place tailored CLS reporting for many important programs including the C-17, C-5 Reliability Enhancement and Re-engineering Program, MQ-1C, F-22, F/A-18E/F, EA-18G, Light Utility Helicopter, Stryker, and V-22 programs. In addition, the DCARC proposed a new standard format for the reporting of actual CLS costs. The F-35 program will be one of the first programs to consider use of the new standard data reporting structure for reporting of CLS costs.
- *Improve the use of developmental and operational test data in support of O&S cost estimates and projections of system reliability growth.* As a first step, CAPE has formed a partnership with the test community on the F-35 program to ensure that all test and evaluation data is provided promptly and is used to update O&S cost estimates for the program. The experience from this first case will be refined and used as a model for future programs.
- *Assess the analytical capabilities, human resources, and information systems supporting O&S cost estimates and analyses across the Department's cost analysis organizations.* CAPE conducted an annual review of the military departments' VAMOSOC systems, and found that the Army system requires additional resources to correct several deficiencies identified by the Government Accountability Office. The Air Force system also requires additional resources to sustain existing capabilities. CAPE will work with the military departments to properly resource the VAMOSOC programs to correct these deficiencies in the preparation of the FY 2013–17 program and budget.

CAPE is continuing to work with the Assistant Secretary for Logistics and Materiel Readiness on the implementation of the recommendations noted above. Part of this implementation will be addressed through new policies and procedures to strengthen the use of O&S cost estimates. The current activities to develop these policies and procedures are described in Chapter V.

DoD Cost Analysis Symposium

The annual DoD Cost Analysis Symposium (DoDCAS) that is sponsored by CAPE was held in February 2010 (see <http://www.dodcas.org>). The theme of the symposium was “Theory and Implementation of WSARA 2009.” The plenary sessions and round table discussions were supported by several senior DoD officials that addressed the policy implications of WSARA implementation. Also, three concurrent track sessions were held that addressed (1) MAIS programs, (2) the development of the cost community, and (3) methods for estimating the unknowns (with specific topics including risk assessments and confidence levels, and cost estimates for reviews at Milestone A). The papers presented at the symposium are archived at the DoDCAS web site.

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CHAPTER V – THE LOOK FORWARD

WSARA introduced major changes to the DoD cost estimation process. Since its enactment, CAPE has made significant progress in implementing these changes. This chapter discusses the status and future plans for several key initiatives that collectively will provide this implementation.

Organizations and Human Resources

WSARA requires the CAPE Director to lead the development of improved analytical skills and competencies within the cost assessment and program evaluation workforce of the Department. However, as noted in Chapter II, the cost estimating workforce is distributed among several organizations throughout the Department. Consequently, identifying and remedying issues with the size, shape, and organization of the DoD cost estimating workforce requires an integrated and collaborative effort, with the CAPE Director as the leader and primary advocate for the entire DoD cost community.

Efforts toward that end continued this year with activities to gather data on the work load, workforce demographics, and workforce management plans of the organizations that produce DoD cost estimates. CAPE will continue to work with the Service Cost Agencies and other appropriate organizations to gather pertinent data in the manner required for workforce management and consistent historical tracking.

The provisions of WSARA expanded CAPE responsibilities for cost assessment significantly, and it will be necessary for CAPE to recruit additional qualified and talented people. These provisions not only required a substantial expansion of CAPE personnel, but also in some cases require a different set of skills and experience. The CAPE Deputy Director for Cost Assessment has continued efforts to expand the current staff, and has hired seven additional government personnel during the fiscal year. However, the Department's efficiency initiatives, manpower caps, and executive reductions will pose challenges in increasing staff in the future. The near-term plan is to grow Cost Assessment capabilities by shifting personnel and other resources from other lower priority efforts in the CAPE organization.

Policies and Procedures

WSARA states that the CAPE Director—in consultation with other officials of OSD, the military departments, and Defense Agencies—shall prescribe policies and procedures for the conduct of cost estimation and cost analysis for the acquisition programs of the DoD. These policies and procedures have general applicability to all acquisition programs, although the implementation details refer specifically to MDAPs and MAIS programs.

Much of this guidance is being built on existing policies and procedures, improved and strengthened as necessary. The current guidance for DoD cost estimating and cost analysis addresses (1) the statutory requirements for independent cost estimates; (2) the review process for military department and Defense Agency cost estimates (when the Milestone Decision Authority is the USD(AT&L)); (3) the use of standard life-cycle cost terms and definitions; (4) the use of the CARD as the technical and programmatic baseline that serves as the foundation for Component and OSD cost estimates; and (5) DoD cost data collection systems. The current guidance was described in depth in last year's annual report.

Each of the current guidance documents is being reviewed in light of WSARA and revised as necessary. CAPE has completed a draft DoD directive that defines overall CAPE responsibilities and functions in the PPBE, acquisition, and requirements processes. The plan is to also issue a more specialized directive or instruction focused on cost assessment responsibilities within the next nine months. Also, CAPE is working on a series of more detailed policy and procedure memoranda focused on specific topics. These memoranda will be either promulgated individually as interim guidance or incorporated into appropriate regulations. The current efforts to develop these memoranda are focused in the following areas:

- Milestone Reviews. CAPE is strengthening current guidance concerning Component cost estimates and independent cost estimates, supporting milestone reviews of MDAPs. The intent is to establish a disciplined and orderly process, but allow a degree of flexibility depending on the complexity and risks of the program. A key emphasis of this guidance will be early preparation—the process associated with a CAPE independent cost estimate begins with an estimate planning meeting with all relevant stakeholders nominally held 12 months before the scheduled milestone review. In this guidance, the specific approach for the cost assessment process will vary by program milestone (A, B, C, or Full-Rate Production), since the nature of the decisions being supported by cost estimates depends on the maturity of the program.
- Unit Cost Breach (Nunn-McCurdy) Reviews. This guidance will articulate the CAPE process to establish an independent cost estimate, and a position on the reasonableness of new estimates of program unit costs, following a critical unit cost breach. Typically, this process follows a more compressed and demanding timeline than the process followed for milestone reviews. In addition, the CAPE staff may be called upon to assist in assessments of program alternatives or restructuring.
- Multi-Year Procurement. New guidance is being developed to ensure that CAPE supports its statutory obligations associated with the award of major multi-year procurement (MYP) contracts. These obligations were discussed in Chapter II. This guidance will build upon the experience and lessons learned from recent or ongoing CAPE analyses of multi-year savings for the F/A-18E/F and H-60 programs.
- MAIS Programs. This guidance will address the implementation of new responsibilities for CAPE established by WSARA concerning MAIS programs. These responsibilities are (1) the preparation of an independent cost estimate following a Critical Change, (2) the preparation of an independent cost estimate at milestone reviews when requested by the Milestone Decision Authority, and (3) the preparation and assessment of Component cost estimates when the CAPE independent cost estimate is not required. Part of this guidance will address the documentation requirements for the Component cost estimates.
- CARD Guidance. CAPE is working to simplify the CARD and streamline the CARD preparation process, thereby reducing the burden imposed on program offices. The new guidance for CARD preparation will focus on the minimum essential information necessary to support cost estimates. The new guidance also will permit liberal referencing to other key program documents, thus eliminating any redundancies between the CARD and documents such as the acquisition strategy, test and evaluation master plan, and systems engineering plan.
- O&S Cost Estimates. CAPE and the Assistant Secretary for Logistics and Materiel Readiness are working to place more emphasis on the role of O&S cost estimates in support of the defense acquisition process. The strategic intent is to emphasize how O&S cost estimates will actively

support key decisions throughout the system life cycle, rather than calling for O&S cost estimates simply for the sake of having an estimate. In addition, this guidance is being developed to address the implementation of the recommendations provided in the May 2010 CAPE report to the Congress concerning O&S costs for MDAPs. These recommendations were discussed in Chapter IV. In the long-term, as these policies and procedures expand the role of O&S cost estimates, the plan is to devote additional personnel and resources to O&S cost analyses throughout the Department.

- Estimates for Contract Negotiations. Section 811 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*, established that for MDAPs and MAIS programs, cost estimates developed for baselines and other program purposes are not to be used for the purpose of contract negotiations or obligation of funds. Section 811 also states that cost analyses and targets developed for the purpose of contract negotiations shall be (1) based on the Government's reasonable expectation of successful contractor performance in accordance with the contractor's proposal and previous experience, and (2) carried out in accordance with guidance issued by the Director of CAPE. Guidance for this topic will be developed by CAPE—in consultation with the financial management, program management, and contracting communities—to ensure that proper policy and procedures are developed and put in place to guide the development of cost estimates for contract negotiations, and that independent cost estimates are not used as the basis for negotiations on individual contracts.

Cost Data Systems

Systematic and institutionalized cost data collection throughout DoD is important to support credible cost estimates for current and future acquisition programs. As described in Appendix D, DoD has three main cost data reporting systems: (1) the CSDR system, used for acquisition cost data; (2) the EVM Central Repository, used for centralized electronic warehousing of EVM data reports; and (3) the VAMOS data systems, used to collect O&S costs for the major fielded weapon systems.

This year, the DCARC worked to update and strengthen the policy, procedures, report formats, and detailed implementation guidance for CSDR that is provided in DoD 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*. A new draft of the Manual (including the supplementary CSDR report formats and instructions to contractors) was prepared, and is now being reviewed by all of the relevant stakeholders. The new Manual adds a new report (Contractor Business Data Report) that provides data on plant-wide overhead and other indirect costs. The Manual also establishes an improved system for the electronic submission of plans and reports through use of a DoD Common Access Card.

Although the CSDR requirements for MDAPs and MAIS programs are clearly established in DoD Instruction 5000.02, *Operation of the Defense Acquisition System*, there had been a problem ensuring contracting officers consistently placed the appropriate CSDR requirements in contracts. To address this problem, the DCARC worked to establish formal language regarding CSDR in the Defense Federal Acquisition Regulation Supplement (DFARS). The proposed CSDR language was approved by the Defense Acquisition Regulatory Council in September 2010 and was formally published in the DFARS shortly thereafter.

Tracking to Approved Estimate—PPBE and Acquisition

As noted in our 2009 Annual Report, cost estimates made to support milestone reviews and major program reviews should be used as the basis for budgeting. Changes to programs are necessary as they move beyond their acquisition milestone approval and proceed through successive iterations of the PPBE system.

To remain current with program changes that affect cost and schedule, CAPE, USD(Comptroller), and USD(AT&L) established the MDAP Issue Team. The purpose of the MDAP Issue Team is to ensure that the sections 2366a and 2366b certified MDAPs remain fully funded during preparation of the FYDP and that these programs retain their certification status. The MDAP Issue Team also attempts to identify potential unit cost (Nunn-McCurdy) breaches and evaluate needed improvements in cost and resource information needed by the Department.

Cost Indexes

WSARA requires that CAPE periodically assess and update the cost indexes used by the Department to ensure that such indexes have a sound basis and meet the Department's needs for realistic cost estimation. The cost indexes used by DoD all rest on inflation forecasts made by the administration and issued by the Office of Management and Budget (OMB). The use of the OMB forecast is directed by OMB Circular No. A-11 (*Preparation, Submission and Execution of the Budget*). OMB's authority to issue this guidance rests on statute.

In FY 2010 CAPE commissioned an independent study concerning cost indexes to provide a factual and analytical basis for responding to this provision of WSARA. That study will review the statutory and regulatory provisions that support the issuance of inflation guidance provided to the DoD Components. The study will consider how this guidance is applied by OSD, the military departments, and the major Defense Agencies to adjust for inflation in estimating the costs of, and budgeting for, major programs. The study also will evaluate the appropriateness of current practices both for preparing budgets and for tracking cost growth in major acquisition programs. Finally, the study will compare the currently prescribed rates with some alternatives and consider whether modifications to current practices might better meet the Department's needs for realistic cost estimation.

Cost Education, Skills, and Tools

CAPE is leading the development of (1) improved analytical skills and competencies within the cost assessment workforce of the DoD and (2) improved tools, data, and methods to promote performance, economy, and efficiency. CAPE is participating in several initiatives to improve the education and training of the larger DoD civilian and military workforce in cost assessment in accordance with the assigned responsibilities and goals of WSARA.

CAPE has worked with the Navy, the Naval Postgraduate School (NPS), and the Air Force Institute of Technology (AFIT) to launch an accredited Master's Degree Program in Cost Estimation beginning in April 2011. This two-year, distance-learning program will improve the education of the cost estimating community in both the DoD and in the defense industrial base. Also, the Army continues to sponsor a one-month residence program, taught by the NPS business school, which provides a certificate in cost management for Army personnel. CAPE also continues to sponsor a one-week resource analysis course

taught at the Institute for Defense Analyses. CAPE has also initiated work with the Defense Acquisition University to evaluate and improve the Defense Acquisition Workforce Improvement Act curriculum for certification in cost estimation. CAPE also sponsors and hosts the annual DoD Cost Analysis Symposium as discussed in Chapter IV.

Summary

CAPE is continuing to develop and refine plans for the Department's cost estimating and cost analysis functions. Implementation of these plans will ensure that the cost assessment organizations, workforce, policies and procedures, data collection systems, and training and education programs will grow and improve as necessary to meet the expanded roles and responsibilities established by WSARA. CAPE will continue to work with the Department's other cost and acquisition organizations to strengthen cost assessment so that better cost and schedule estimates are properly prepared and considered in the deliberations of all major acquisition programs. The progress on these initiatives will be reported in future editions of this report.

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APPENDIX A

Cost Analysis Organizations in DoD

Independent Cost Assessment Organizations

There are four key offices for the preparation of independent cost estimates. Within OSD, the office responsible for independent cost estimates reports to the CAPE Director. Within the military departments, these offices all report to their Assistant Secretary for Financial Management. The following paragraphs give a brief description and overview of these key offices responsible for independent cost estimates.

OSD - Office of the Deputy Director for Cost Assessment

The CAPE Deputy Directorate for Cost Assessment performs independent cost estimates for all MDAPs and MAIS programs when acquisition oversight has not been delegated to a military department or Defense Agency, and it reviews all cost estimates and cost analyses prepared by the military departments and Defense Agencies in connection with other MDAPs and MAIS programs.

Army - Deputy Assistant Secretary of the Army for Cost and Economics

The Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE) develops statutory independent cost estimates and Component cost analyses of weapon and information systems. DASA-CE conducts independent reviews and validation of business case analyses, economic analyses, and special cost studies of major weapon and information systems, force structure, and operating and support cost. DASA-CE serves as the Cost and Economics advisor for Army Study Advisory Groups. It chairs and oversees the Army Cost Review Board, develops and approves the Army Cost Position for all major acquisition programs, and conducts in-depth risk analyses of major Army programs and associated costs.

Navy - Naval Center for Cost Analysis

The Naval Center for Cost Analysis (NCCA) prepares independent cost estimates for Department of Navy MDAPs and MAIS programs. NCCA coordinates all Department of Navy cost research. Its research includes improved methods for estimating specific cost elements for key development phases of acquisition programs. Examples of such cost elements include nonrecurring engineering, system integration, government in-house support, etc.

Air Force - Air Force Cost Analysis Agency

The Air Force Cost Analysis Agency (AFCAA) supports the Air Force by providing independent cost analyses and special studies in support of weapon system programs. AFCAA also conducts and coordinates cost research to develop analytical tools, models, and databases.

Additional Field-Level Cost Organizations and Activities

There are several field-level cost organizations. These typically are located at a major product center such as the Naval Air Systems Command or the Air Force Electronic Systems Center. This section provides a summary of many of these important organizations; however, this list is not complete, and other organizations will need to be added to future editions of this annual report.

Army

TACOM Life Cycle Management Command (LCMC)

The TACOM LCMC cost organization is responsible for preparation of program office estimates, life-cycle cost estimates, economic analyses, and combat effectiveness modeling that support the development of combat and tactical vehicles.

Aviation and Missile Life Cycle Management Command (AMCOM)

The AMCOM cost organization provides cost estimation and analysis support to Aviation, Missiles and Space Program Executive Offices and their Program/Project Offices. It manages the AMCOM Cost Analysis Program and develops, updates, or obtains Cost Estimating Relationships, cost factors, and mathematical and computerized cost models for estimating purposes. It develops cost estimates to support AoAs, tradeoff studies, and force structure cost estimates. It develops and prepares life-cycle cost estimates, and it conducts other related studies in support of weapon systems cost analysis. It performs cost risk analyses and cost risk assessments to support weapon systems program decisions. It also provides validation/review for cost estimates, economic analyses, and business case analyses.

Navy

Naval Air Systems Command (NAVAIR)

The Cost Department of the Naval Air Systems Command provides a wide variety of cost analysis products and services. Its primary focus is to provide a clear and comprehensive understanding of life-cycle cost and attendant uncertainties to be used in developing, acquiring, and supporting affordable naval aviation systems. Besides life-cycle cost estimates, the Cost Department provides source selection cost evaluation support, earned value management analysis, cost research, databases, and various cost/benefit studies.

The focus of NAVAIR cost research is Total Ownership Cost initiatives, cost growth, modifications, cost/benefit analyses, engineering investigations, and building comprehensive databases.

Naval Sea Systems Command (NAVSEA)

The Cost Engineering and Industrial Analysis Division of NAVSEA provides cost engineering and industrial base analysis for ships, ship-related combat systems, and weapons. It provides cost estimates in support of the Defense Acquisition Board review process, including AoA studies. It also participates in contract proposal evaluations and the source selection process for builders and suppliers of ships and weapon systems, and it conducts analysis and forecasting of labor, industrial, and technical trends as they affect the overall acquisition of ships, combat systems, weapons, and other equipment.

The focus of the cost research program within NAVSEA is O&S cost estimating; Total Ownership Cost estimating; commonality and standardization of ship design and construction processes, as well as ship components or subassemblies (impact on acquisition and O&S costs); how build strategy affects ship costs; ship design trade-off analysis tools; and ship and weapon system cost modeling.

Naval Surface Warfare Center

The Cost Analysis Group resides within the Warfare Analysis Branch of the Requirements Analysis and Advanced Concepts Division of the Warfare Systems Department at the Naval Surface Warfare Center, Dahlgren Division. The Cost Analysis Group produces cost estimates, cost-risk assessments, and affordability analyses for Combat Systems. The Group also develops cost-estimating methodology in support of systems development and production, AoAs, and strategic planning. Particular areas of expertise include model development and maintenance, cost-research databases, technology assessments, life-cycle cost estimates, budget and force-level analyses, performance-based cost models, product-oriented cost models, proposal evaluation, and source selection reviews.

Air Force

Electronic Systems Center

The Acquisition Cost Division supports the Electronic Systems Center by providing independent analysis and verification of electronic systems' cost to the Center's leadership, with a focus on improving the overall quality, objectivity, and credibility of cost estimates. The Cost Division leads the Center's modern, quick-reaction cost tools program and spearheads comprehensive cost training essential to cost analysts and program managers throughout the Center.

Air Force Space Command, Space and Missile Center

The Acquisition Cost Division supports cost estimates and cost analyses associated with Air Force Space Command and the Space and Missile Center's mission of satellite acquisition, launch, and control.

National Reconnaissance Office (NRO) Cost Analysis Improvement Group

The NRO Cost Analysis Improvement Group provides independent cost estimating support to NRO. This support covers milestone decisions, budget submissions, Earned Value Management, ad hoc program support, data collection, methods development, and model/tool development.

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APPENDIX B

Major Defense Acquisition Program Unit Cost Reporting

Since 1982, Congress has required DoD to track and report on the unit cost for most MDAPs. The requirement for unit cost reporting may be waived if the program has not entered Engineering and Manufacturing Development, a reasonable cost estimate has not been established for the program, and the system configuration is not well defined. The provisions of the law concerning unit cost reporting, commonly referred to as the “Nunn-McCurdy” provisions, are found in section 2433 of title 10, *United States Code*. A complete description of the Department’s implementation of these provisions is provided in the *Defense Acquisition Guidebook* (see <https://dag.dau.mil>), chapter 10, section 10.9.1.3 (“Unit Cost Reports”) and section 2.1.1 (“Acquisition Program Baseline”).

There are two unit cost metrics subject to reporting, Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC). PAUC is defined as the total program acquisition cost (sum of research, development, test, and evaluation plus procurement plus military construction) divided by the total program quantity of fully configured end items. APUC is defined as the program procurement cost divided by the procurement quantity. Both unit cost metrics are tracked in constant dollars of a base year fixed for each program.

The most current cost estimate for each unit cost metric is tracked relative to two baseline cost estimates. The current baseline estimate refers to the most recent baseline approved by the Milestone Decision Authority. The original baseline estimate refers to the baseline approved at program initiation (usually Milestone B). A program is declared to have a unit cost breach (Nunn-McCurdy breach) when the current unit cost estimate exceeds either baseline estimate by more than certain specified percentages. Specifically, as shown in Table B-1, a unit cost breach takes place when any of the following conditions occurs, for either version of program unit cost (APUC or PAUC):

Table B-1. Nunn-McCurdy Breach Thresholds

	“Significant” Breach	“Critical” Breach
Current Baseline Estimate	+15%	+25%
Original Baseline Estimate	+30%	+50%

Note that there are two degrees associated with the severity of the unit cost breach. For significant unit cost breaches, the Department notifies the Congress of the breach within 45 days of the unit cost report and subsequently submits a program SAR with additional, breach-related information. For critical unit cost breaches, in addition to the notifying the Congress and submitting the SAR, the Department is required to conduct a complete assessment of the program and determine if it should be terminated or continued. This assessment is led by USD(AT&L). The Department is required to terminate the program unless a letter signed by the USD(AT&L) providing the certification that the program currently meets certain criteria established in law (section 2433a of title 10, *United States Code*) is submitted to the

Congress within 60 days of the SAR submission. Among other things, USD(AT&L) must certify that the Director, CAPE has determined the new unit cost estimates are reasonable. A complete description of the unit cost breach certification process can be found in the *Defense Acquisition Guidebook*, chapter 10, section 10.9.1.3.2.

APPENDIX C

Major Automated Information System Reporting

Public law (section 2445c of title 10, *United States Code*) requires annual and quarterly reports from MAIS programs, pre-MAIS programs, and “any other investment in automated information system products or services that is expected to exceed the [MAIS] thresholds...” Details about the reporting requirements may be found in the *Defense Acquisition Guidebook*, chapter 10, section 10.9.2. Briefly, a Major Automated Information Systems Quarterly Report is used internally within the Department, and a Major Automated Information Systems Annual Report is provided to the congressional defense committees 45 days after submission of the President’s Budget. The formats of the quarterly report and annual report are similar. The reports provide a program description and the latest status regarding schedule, performance characteristics, development cost, and life-cycle cost.

The reports compare the latest estimates of schedule, performance, and cost relative to the program baseline approved at the previous acquisition milestone. This comparison is used to determine if the program has a deviation known as either a Significant Change or Critical Change. A Significant Change occurs when a program has a schedule delay of more than six months, but less than one year; there is a significant, adverse change in the expected performance of the system; or the estimated development cost or life-cycle cost has increased by at least 15 percent but less than 25 percent. For a program with a Significant Change, the Department is required to notify the congressional defense committees of the change within 45 days after receiving the report that identified the deviation. A Critical Change occurs when a program has a schedule delay of one year or more or fails to achieve a full deployment decision within five years of when funds for the program were first obligated; there is a change in expected performance that will undermine the ability of the system to perform its intended functions; or the estimated development cost or life-cycle cost has increased by 25 percent or more. For a program with a Critical Change, the Department must conduct an evaluation of the program, and then submit a report and a formal certification to the congressional defense committees within 60 days after receiving the report that identified the deviation.

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APPENDIX D

DoD Cost Data Collection Systems

Three primary data collection systems are used by DoD as the major sources of cost data for major acquisition programs. The CSDR system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with MDAPs. The EVM Central Repository is used to collect and archive EVM reporting documents (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports). The VAMOS systems collect historical O&S costs for major weapon systems.

Cost and Software Data Reporting System

The CSDR system is the primary means that DoD uses to collect actual cost and related data on major defense contracts. Program managers support the CSDR system by reporting data on contractor development and production costs and resource usage incurred in performing DoD programs. Its two principal components are contractor cost data reporting (CCDR) and software resources data reporting (SRDR).

CCDR is the primary means within DoD to systematically collect data on the development and production costs incurred by contractors. DoD Instruction 5000.02, *Operation of the Defense Acquisition System*, establishes the CCDR requirements for major contracts and subcontracts (regardless of contract type) associated with MDAPs.

The SRDR system collects software metrics data to supplement the CCDR cost data to provide a better understanding and improved estimating of software-intensive programs. DoD Instruction 5000.02 establishes SRDR requirements for major contracts and subcontracts (regardless of contract type) associated with MDAPs. Data collected from applicable contracts include type and size of the software application(s), schedule, and labor resources needed for the software development.

Detailed procedures and other implementation guidance for both CSDR systems are found in DoD 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*.¹ This manual (as well as downloadable report formats and definitions, specific report examples, and other related information) can be found at the DCARC Web site (<http://dcarc.pae.osd.mil>). The DCARC is the OSD office responsible for administering the CSDR system. Access to CSDR data is provided by the DCARC to DoD government cost analysts who are registered users.

Earned Value Management Central Repository

In collaboration with the staff of USD(AT&L), the DCARC hosts the EVM Central Repository. The central repository supports the centralized reporting, collection, archiving, and distribution of key EVM data reports (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports) for MDAPs and MAIS programs. Information about the central repository is available at the DCARC Web site (<http://dcarc.pae.osd.mil/EVM/Index.aspx>). More general information about EVM

¹ Accessible at www.dtic.mil/whs/directives/corres/pdf/500004m1p.pdf.

reporting is available in the *Defense Acquisition Guidebook* (<https://dag.dau.mil>), chapter 11, section 11.3.1.

The central repository supports complete, timely, and secure transfer of electronic data from the contractor to the repository; secure and controlled warehousing of the data; and controlled, timely, and secure access to the data by authorized users. The main purpose of these data is to provide a consistent and timely situational awareness of acquisition execution.

Both the CCDR and the EVM reporting use a common, product-oriented taxonomy known as a Work Breakdown Structure (WBS) that follows the guidelines of the DoD Work Breakdown Structure Handbook (MIL-HDBK-881A). The WBS is a hierarchy of product-oriented elements (hardware, deliverable software, data, and services) that collectively constitute the system to be developed or produced. An initiative is now underway to improve and expand the WBS definitions, and to reissue the handbook (MIL-HDBK) as a military standard (MIL-STD) to ensure more consistency in its application. Further information about the use of the Work Breakdown Structure in cost reporting and cost estimating can be found in the *Defense Acquisition Guidebook*, chapter 3, section 3.7.1.1.

Visibility and Management of Operating and Support Costs Data System

DoD requires that each military department maintain a system that collects historical data on the O&S costs for major fielded weapon systems. The Deputy Director for Cost Assessment provides policy guidance on this requirement, known as the VAMOSC program; specifies the common format in which the data are to be reported; and monitors its implementation by each of the military departments. Each department has its own unique VAMOSC data system that tracks actual O&S cost experience for major weapon systems. The data can be displayed by time frame, at various levels of detail, and by functional elements of cost (such as depot maintenance, fuel, consumable items, and so forth). Each VAMOSC system provides not only cost data, but related non-cost data (such as system quantities and operating tempo) as well. VAMOSC data can be used to analyze trends in O&S cost experience for each major system, as well as to identify and assess major cost drivers. In addition, VAMOSC data are important as a source for cost estimates of future systems, as cost estimates for future systems are often made by analogy to appropriate predecessor systems. VAMOSC data systems are managed by each military department as follows:

- The Navy's VAMOSC management information system collects and reports U.S. Navy and U.S. Marine Corps historical weapon system O&S costs. VAMOSC provides the direct O&S costs of weapon systems; some indirect costs (e.g., ship depot overhead); and related non-cost information such as flying hour metrics, steaming hours, age of aircraft, personnel counts for ships, etc. It is managed by the Naval Center for Cost Analysis.
- The Army's VAMOSC system, called the Operating and Support Management Information System (OSMIS), tracks operating and support information for over 1,000 major Army weapon/materiel systems and is maintained by the Office of the Deputy Assistant Secretary of the Army for Cost and Economics. OSMIS-tracked systems include combat vehicles, tactical vehicles, artillery systems, aircraft, electronic systems, and miscellaneous engineering systems.
- The Air Force's VAMOSC system, called the Air Force Total Ownership Cost (AFTOC) system, is managed by the Air Force Cost Analysis Agency. It provides O&S cost information on all Air Force aircraft, space systems, and missiles. The O&S cost information collected includes

unit-level manpower, fuel, depot maintenance overhaul costs, depot-level reparable costs, and condemnation costs of major U.S. Air Force aircraft and engines.

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ABBREVIATIONS

ACAT	Acquisition Category
AFCAA	Air Force Cost Analysis Agency
AFIT	Air Force Institute of Technology
AFTOC	Air Force Total Ownership Cost
AMCOM	Aviation and Missile Life Cycle Management Command
AoA	Analysis of Alternatives
APB	Acquisition Program Baseline
APUC	Average Procurement Unit Cost
ATIRCM/CMWS	Advanced Threat Infrared Countermeasure/Common Missile Warning System
CA	Cost Assessment
CAPE	Cost Assessment and Program Evaluation
CARD	Cost Analysis Requirements Description
CCDR	Contractor Cost Data Reporting
CLS	Contractor Logistics Support
CMWS	Common Missile Warning System
CSDR	Cost and Software Data Reporting
DAB	Defense Acquisition Board
DASA-CE	Deputy Assistant Secretary of the Army for Cost and Economics
DCARC	Defense Cost and Resource Center
DoD	Department of Defense
DoDCAS	Department of Defense Cost Analysis Symposium
DTM	Directive-Type Memorandum
EVM	Earned Value Management
FYDP	Future Years Defense Program
GCV	Ground Combat Vehicle
JTRS	Joint Tactical Radio System
LCMC	Life Cycle Management Command
MAIS	Major Automated Information System
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MIDS	Multifunctional Information Distribution System
MYP	Multi-Year Procurement
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NCCA	Naval Center for Cost Analysis
NPS	Naval Postgraduate School
NRO	National Reconnaissance Office
O&S	Operating and Support
OMB	Office of Management and Budget

OSD	Office of the Secretary of Defense
OSMIS	Operating and Support Management Information System
PARCA	Performance Assessments and Root Cause Analyses
PAUC	Program Acquisition Unit Cost
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting and Execution
RFP	Request for Proposal
SAR	Selected Acquisition Report
SRDR	Software Resources Data Reporting
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
VAMOSC	Visibility and Management of Operating and Support Costs
WBS	Work Breakdown Structure
WIN-T	Warfighter Information Network - Tactical
WSARA	Weapon Systems Acquisition Reform Act

